

ECISS
 EUROPEAN COMMITTEE FOR IRON AND STEEL STANDARDIZATION
 COMITÉ EUROPÉEN DE NORMALISATION DU FER ET DE L'ACIER
 EUROPÄISCHES KOMITEE FÜR EISEN-UND STAHLNORMUNG

EUROPEAN CERTIFIED REFERENCE MATERIAL (EURONORM – CRM)

CERTIFICATE OF CHEMICAL ANALYSIS
EURONORM – CRM No. 782-1 DOLOMITE

LABORATORY MEANS (4 Values), all results relate to the dried (105°C) sample
 mass content in %

Line No.	Si	Al	Ti	Fe	Mn	Ca	Mg	LOI	Cr	K	P	Pb	Zn	B	Ba	Ni	S
1	-	0.0455	0.0019	0.2998	0.0548	21.4876	12.6161	46.9510	0.0003	-	-	-	-	0.0008	0.0004	0.0001	0.0118
2	0.1139	0.0472	0.0020	0.3005	0.0585	21.5988	12.6285	46.9728	0.0003	0.0183	0.0051	0.0022	0.0057	0.0010	0.0005	0.0001	0.0120
3	0.1156	0.0493	0.0021	0.3007	0.0602	21.6000	12.6639	47.0179	0.0003	0.0189	0.0051	0.0023	0.0058	0.0013	0.0006	0.0002	0.0127
4	0.1167	0.0544	0.0023	0.3067	0.0613	21.6150	12.6641	47.0732	0.0004	0.0190	0.0051	0.0025	0.0060	0.0013	0.0006	0.0003	0.0144
5	0.1207	0.0545	0.0024	0.3080	0.0613	21.6221	12.7256	47.1050	0.0004	0.0199	0.0051	0.0025	0.0061	0.0014	-	0.0003	0.0153
6	0.1218	0.0547	0.0025	0.3098	0.0625	21.6320	12.7281	47.1224	0.0005	0.0200	0.0052	0.0026	0.0065	0.0014	0.0007	0.0003	-
7	0.1224	0.0548	0.0025	0.3117	0.0625	21.6520	12.7498	47.1250	0.0006	0.0220	0.0054	0.0026	0.0066	0.0014	0.0007	0.0003	0.0169
8	0.1233	0.0548	0.0025	0.3140	0.0629	21.6675	12.8000	47.1625	0.0007	0.0221	0.0055	0.0026	0.0066	-	0.0007	-	0.0177
9	0.1233	0.0551	0.0026	0.3150	0.0629	21.7119	12.8108	47.1950	0.0007	0.0225	0.0057	0.0027	0.0067	-	0.0008	0.0007	0.0185
10	0.1247	0.0562	0.0026	0.3160	0.0635	21.7300	12.9232	47.2321	0.0008	0.0228	0.0060	0.0027	0.0069	-	0.0010	0.0007	0.0186
11	0.1254	0.0573	0.0027	0.3185	0.0637	21.7325	12.9768	47.2700	0.0008	0.0236	0.0060	0.0027	0.0070	-	0.0011	0.0008	0.0210
12	0.1260	0.0578	0.0028	0.3188	0.0637	21.7433	12.9940	47.2900	0.0010	0.0236	0.0062	0.0030	0.0070	-	-	-	-
13	0.1287	0.0583	0.0029	0.3202	0.0655	21.7700	12.9973	47.3008	-	0.0236	0.0062	0.0031	0.0070	-	-	-	-
14	0.1325	0.0594	0.0029	0.3234	0.0661	21.7771	13.0000	47.4775	-	0.0243	-	0.0032	0.0073	-	-	-	-
15	0.1335	0.0595	-	0.3260	0.0672	21.7817	13.0325	47.5969	-	-	-	-	0.0074	-	-	-	-
16	0.1338	0.0623	-	0.3272	0.0675	21.7985	-	47.6875	-	-	-	-	-	-	-	-	-
17	-	-	-	0.3309	0.0692	-	13.1000	47.6875	-	-	-	-	-	-	-	-	-
M_M	0.1242	0.0551	0.0025	0.3145	0.0631	21.6825	12.8382	47.2510	0.0006	0.0216	0.0056	0.0027	0.0066	0.0012	0.0007	0.0004	0.0159
s_M	0.0062	0.0045	0.0003	0.0095	0.0035	0.0868	0.1628	0.2338	0.0002	0.0021	0.0005	0.0003	0.0005				
s_w	0.0014	0.0024	0.0002	0.0056	0.0013	0.0516	0.0448	0.0499	0.0001	0.0011	0.0003	0.0002	0.0002				

M_M : Mean of the laboratory means s_M : Standard deviation of the laboratory means
 s_w : Intralaboratory standard deviation s_b : Interlaboratory standard deviation

$$s_M = \sqrt{s_b^2 + s_w^2/4}$$

The laboratory mean values have been examined statistically to eliminate outstanding values. Where a "-" appears in the table it indicates that an outlying value has been omitted by either the Cochran or Grubbs Test.

CERTIFIED VALUES
 mass content in %

	Si	Al	Ti	Fe	Mn	Ca	Mg	LOI	Cr	K	P	Pb	Zn
M_M	0.124	0.055	0.0025	0.314	0.063	21.68	12.84	47.25	0.0006	0.0216	0.0056	0.0027	0.0066
C(95%)	0.003	0.003	0.0002	0.005	0.002	0.05	0.09	0.12	0.0002	0.0013	0.0003	0.0002	0.0003

The half-width confidence interval $C(95\%) = \frac{t \times s_M}{\sqrt{n}}$ where t is the appropriate Student's t value and n is the number of acceptable mean values

For further information regarding the confidence interval for the certified value see ISO Guide 35:1989 section 4.



Certificate No. 94/3993

This reference material was prepared and issued by:

BUREAU OF ANALYSED SAMPLES LIMITED

Newham Hall, Middlesbrough, England

On behalf of:- The Iron and Steel Nomenclature Co-ordinating Committee (COCOR) of the ECISS, after approval by all the participating laboratories and all the producing organizations. (France-IRSID/CTIF Germany-Iron and Steel CRM Working Group, UK-BAS Ltd.)

JULY 1996

CERTIFIED VALUES EXPRESSED AS OXIDES (not necessarily actual compositions)
mass content in %

	SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	MnO	CaO	MgO	Cr ₂ O ₃	K ₂ O	P ₂ O ₅	PbO	ZnO
M_M	0.266	0.104	0.0042	0.450	0.081	30.34	21.29	0.0009	0.0260	0.0128	0.0029	0.0082
C(95%)	0.007	0.006	0.0004	0.007	0.003	0.07	0.15	0.0003	0.0016	0.0007	0.0002	0.0004

PARTICIPATING LABORATORIES

Acerinox S.A., Algeciras (Spain)	Hoogovens Groep BV, IJmuiden (Netherlands)
Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin (Germany)	Luxcontrol S.A., Esch-sur-Alzette (Luxembourg)
British Ceramic Research Ltd, Stoke on Trent (UK)	Max-Planck-Institut für Eisenforschung GmbH., Düsseldorf (Germany)
Böhler Edelstahl GmbH, Kapfenberg (Austria)	Ridsdale & Co. Ltd., Middlesbrough (UK)
Centro Nacional de Investigaciones Metalurgicas (CENIM), Madrid (Spain)	Sandberg, London (UK)
Cockerill Sambre S.A., Couillet (Belgium)	SOLLAC, Dunkerque (France)
Cookson Group plc., Oxford (UK)	SOLLAC, Florange (France)
Centre des Recherches Maidieres, Pont-à-Mousson (France)	Voest Alpine Linz Stahl GmbH., Linz (Austria)
Forschungsinstitut der Zementindustrie, Düsseldorf (Germany)	

DESCRIPTION OF THE SAMPLE

This sample consists of material passing a 125µm sieve after passing over a magnetic separator. It is only supplied in bottles containing 100g.

METHODS USED
EURONORM – CRM No. 782-1

Element	Line Number	Methods
Si	2-3-5-8-9	Gravimetric, dehydration with perchloric acid
	4	ICP-MS
	6-7-13-15	XRF
	10-11-12	Photometric as molybdenum blue, without extraction
	14	Gravimetric, coagulation with polyethylene oxide
	16	PES
Al	1-2-7-10-11	PES
	3-4-9-14-15	XRF
	5-6-8-13-16	FAAS
	12	ICP-MS
Ti	1-3-4-5-10-11-12-13-14	PES
	2-6	XRF
	7-9	Photometric with diantipyrylmethane
	8	ICP-MS
Fe	1-2-13-15	PES
	3-4-5-6-9-17	XRF
	7	ICP-MS
	8-14	FAAS
	10	Photometric with 2,2' dipirydil
	11	Photometric with 8-hydroxy-7-iodoquinoline-5-sulphonic acid (ferron)
Mn	1	ICP-MS
	2-5-9-11-12	PES
	3-4-10-13-14	FAAS
	6-8-15-16-17	XRF
	7	Photometric, oxidation with periodate
Ca	1-3	PES
	2-4-9-11-16	XRF
	5-6-10-13-14	Complexometric titration, visual end-point
	7-8-12	FAAS
	15	Gravimetric after precipitation as oxalate
Mg	1-10-13-15	Complexometric titration, visual end point
	2-6-7-8	FAAS
	3	Gravimetric, magnesium ammonium phosphate
	4-9-11-12-14-17	XRF
	5	PES
LOI	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17	Loss on ignition at 1025°C±25°C

METHODS USED
EURONORM – CRM No. 782-1

Element	Line Number	Methods
Cr	1	Photometric with diphenylcarbazide
	2-3-4-6-8-9-12	PES
	5-10	GFAAS
	7	FAAS
	11	ICP-MS
K	2-4-5-6-7-9-12-13-14	FAAS
	3-10	PES
	8	XRF
	11	FES
P	2-9-13	XRF
	3-8-12	PES
	4-6-7	Photometric as phosphovanadomolybdate
	5-10	Photometric as molybdenum blue, without extraction
	11	ICP-MS
Pb	2-5-7-12	PES
	3-6-10-11-13	GFAAS
	4-8-9	FAAS
	14	ICP-MS
Zn	2-3-5-8-12-15	PES
	4-6-9-10-11-13	FAAS
	7	XRF
	14	ICP-MS
B	1-4-5-6	PES
	2	ICP-MS
	3	Photometric, methylene blue fluoroborate, extraction, ion-exchange separation
	7	Photometric with curcumin
Ba	1-2-3-4-6-7-8-9-11	PES
	10	ICP-MS
Ni	1-4-5-7-10	PES
	2-12	FAAS
	3-6-11	GFAAS
	9	ICP-MS
S	1-3-4	Combustion, infrared absorption
	2	XRF
	5-7-11	PES
	8	Gravimetric as barium sulphate, without separation
	9	Combustion, oxidation-reduction titration
	10	Photometric as molybdenum blue, separation as sulphide

Abbreviations:

FAAS:	Flame Atomic Absorption Spectrometry
FES:	Flame Emission Spectrometry
GFAAS:	Graphite-Furnace Atomic Absorption Spectrometry
ICP-MS:	Inductively Coupled Plasma - Mass Spectrometry
PES:	Plasma Emission Spectrometry
XRF:	X-Ray Fluorescence Spectrometry Fused Bead Technique

FURTHER INFORMATION

For information regarding the preparation, certification and supply of these European Certified Reference Materials (EURONORM-CRMs) and the use of the statistical information given on this certificate, please refer to Information Circulars No. 1 (ECISS) and No. 5 (ECSC), both of which are available from the national standards body in your country. (In the UK this is the BSI, 389 Chiswick High Road, London W4 4AL).

Des informations complémentaires sur la fabrication, la certification et la distribution des Matériaux de Référence Certifiés Européens (EURONORM-MRC) ainsi que sur l'utilisation des informations statistiques données sur le certificat se trouvent dans les circulaires d'information No. 1 (ECISS) et No. 5 (CECA). On peut se procurer ces deux circulaires auprès des organismes nationaux de normalisation. (Pour la France: AFNOR, Tour Europe - Cedex 7, 92080 Paris La Défense).

Angaben über Herstellung, Zertifizierung und Bezugsmöglichkeiten dieser Zertifizierten Europäischen Referenzmaterialien (EURONORM-ZRM) sowie über die Anwendung der in diesem Zertifikat enthaltenen statistischen Daten finden sich in den Mitteilungen Nr. 1 (ECISS) und Nr. 5 (EGKS), beide zu beziehen durch die nationalen Normenorganisationen. (In Deutschland bei der Vertriebsstelle des DIN: Beuth-Verlag GmbH, Burggrafenstrasse 4-10, 10787 Berlin 30).